The Ohio Naturalist,

PUBLISHED BY

The Biological Club of the Ohio State University.

Volume VI. JUNE, 1906. No. 8.

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TERMINOLOGY OF ORGANS IN VARIOUS CONDITIONS OF DEVELOPMENT.

JOHN H. SCHAFFNER.

In describing organs which are undeveloped, defective, or reduced, one is sometimes at a loss as to the proper term to be applied. The words available are used in various ways by different authors. It becomes necessary, therefore, for each individual to make some selection for himself in order to avoid general confusion until a common agreement is reached either through general consent or through some authoritative body. Without going into details on special cases, one may consider the following types of organs representing various stages of individual development or of evolutionary progress.

1. Normal organs in the first stages of development in the individual are "incipient" organs and the beginning of such an organ is its "inception." The writer has proposed the term "incept" as a suitable noun to be used in the same way as the German "anlage." Thus one may say that a bud is an incipient flower, or the bud is the incept of the flower. An incipient organ is one in the embryonic condition but not necessarily an organ of the embryo. Primordium and rudiment have been used as special nouns for incipient organs but rudimentary is a general term and primordial from its paleontological flavor has rather a phylogenetic meaning.

Definition—Incipient organ, incept (Lat. inceptio, incipiens)—An organ in its first stages of development in the life of the individual; an organ in its embryonic condition.

2. Organs in the first stages of their evolution or such as have become specialized or fixed in a certain stage of evolution, while in related groups they have advanced to higher types, are

properly called "nascent" organs. Thus the lung of a reptile must at one time have been a nascent lung while gills were used to aerate the blood. The hypophysis of a moss is a nascent leaf whether it ever develops any further or not. Such organs were called "prophetic" by Agassiz in harmony with his theory of creation. If a noun is to be used it appears to the writer that "primordium" is the correct expression. Thus "primordial organ" becomes synonymous with "nascent organ" and should perhaps have the preference.

Definition—Nascent organ (Lat. nasci, nascens)—An organ at the beginning of its evolution or at the beginning of its development in the race; an organ in its first stages of evolution as compared with other homologous organs.

3. If an organ was developed in the past but is now continually imperfect or undeveloped in the individuals of a species it is called a "vestigial" organ or a "vestige." The three small sterile stamens in a Catalpa flower are vestigial. The splint bones in a horse and the dew-claws on a cow's foot are examples of vestigial organs. Such organs even if no longer functional may still be useful. Some undeveloped organs may however not be vestigial. The incepts may be present in the embryonic state of the individual and may or may not develop, depending on the sex determined during the development of the organism. Such organs may in some cases be vestigial or they may only be special cases of abortion.

Definition—Vestigial organ, vestige (Lat. vestigium)—An organ which was normally developed in the past history of the race but which has become permanently reduced, never developing completely in any individual.

4. If an organ normal in the species fails to develop properly in an individual it may be called an abortive organ. A microcephalic individual has an abortive head. A flower bud or a leaf may be abortive by reason of an unfavorable position on the stem. Abortive organs may sometimes be atavistic, the development having stopped at a stage representing a more primitive condition of the race. Abortive should not be used in the sense of vestigial.

Definition—Abortive organ (Lat. abortare, abortivus)—An organ normal in the species but which has failed to reach full development in the individual.

5. Organs properly developed in the individual sometimes become reduced through disease or other causes. Such organs are properly called "atrophied" organs.

Definition—Atrophied organ (Gr. a trophia)—An organ which is normal in the species and fully developed in the individual, but which has become reduced through pathological conditions or through disuse.

6. Imperfectly developed or reduced organs of all types may be called rudimentary organs or rudiments. So long then as the nature of any incomplete organ is unknown, or speaking generally, it may be called a rudimentary organ; but with complete knowledge, and speaking specifically, it will be called an incipient, a nascent, a vestigial, an abortive, or an atrophied organ as the case may be.

Definition—Rudimentary organ, rudiment (Lat. rudimentum) —An organ in the initial, incipient, or incomplete stage of development; or one that has become reduced either in the history of the race or of the individual.

There are still other types or conditions of organs which may be defined in a definite sense:

1. Atavistic organs are such as show in the individual a return to some ancestral type.

2. Retrogressive organs are such as are passing from a higher to a lower or less perfectly developed condition or state of organization.

3. Abnormal organs are those which deviate from the usual type in some extraordinary way, as in shape, size, number of parts, color or other character. Good examples of abnormal organs are shown in the following: a fasciated stem, a three-parted Fuchsia, or a "web-toed" man. Abnormalities are frequently inherited.

4. Under the term malformed organs, may be included such types as unusual growths due directly to some external condition in the life of the individual, as an insect bud-gall, or a leaf blade of a rhubarb grown in the dark. A good example is a pointed leaf which has become emarginate through some accident during its development. A malformation cannot be transmitted unless acquired characters so called are inheritable.

5. Transformed organs are such as show a change in the individual or the race from one type of structure or function to another. A stamen developing into a petal is a transformed organ. In such transformations there is a failure of the usual hereditary tendencies to assert themselves while other tendencies present in the same cells become dominant when they should be suppressed. Insect wings are probably transformed gills and reptilian lungs transformed air-bladders.

6. Under the term "juvenile organs" may be included all organs which appear on the young individual but which are absent in the adult. They may be special organs of the embryo, or normally developed organs which later drop off or are absorbed. The compound leaves of certain seedling Acacias which in the adult stage have only phyllodes are good examples of juvenile organs; the tail of a tadpole is a juvenile organ. The term embryonic organ may be used for the earlier stage whenever there

is a definite change of environment during development as in mammals, birds, or seed plants, while juvenile may be employed for the succeeding stages. Embryonic is however, the more restricted term and when there is a gradual transformation from the egg or spore to the adult form, the more convenient designation is "juvenile" stage or organ. In cases where there is a definite metamorphosis or succession of forms as in some mosses or in insects the special terms applied to these stages may, of course, be most advantageously used for the special organs of the stage in question.